

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of

Amendment of the Commission's Rules  
with Regard to Commercial Operations in  
the 3550-3650 MHz Band

GN Docket No. 12-354

**RESPONSE OF GOOGLE INC. TO PETITIONS FOR RECONSIDERATION**

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## **Introduction and Summary**

The Commission's rules for the 3.5 GHz band balance two chief goals: they protect incumbent operations while enabling innovation and investment in the band.<sup>1</sup> The Satellite Industry Association (SIA) and National Association of Broadcasters (NAB), however, seek to upset the balance achieved in the Commission's *Report and Order*.<sup>2</sup> The Commission should dismiss these petitions for reconsideration, which appear to be aimed more at impeding deployment of Citizens Broadband Radio Service (CBRS) devices than addressing genuine interference issues. Specifically, the Commission should:

- Reject on both procedural and substantive grounds SIA's request to reconsider various technical rules;
- Reject SIA's challenge to the minimally burdensome registration requirements for earth station operations; and
- Continue to permit professional installers to report CBRS device (CBSD) location.

At the same time, the Commission should grant other pending reconsideration requests and make modest adjustments to improve two technical rules that, if left unaltered, could unjustifiably impede CBRS deployments. First, it should clarify or revisit the rule limiting CBSD transmissions at a boundary of a census tract. Second, the

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<sup>1</sup> See 47 C.F.R. Part 96; *In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959 (2015) (*Report and Order*).

<sup>2</sup> See Petition for Reconsideration of SIA, GN Docket No. 12-354 (filed July 23, 2015) (SIA Petition); Petition for Reconsideration of the National Association of Broadcasters, GN Docket No. 12-354 (filed July 23, 2015) (NAB Petition).

Commission should clarify or modify the required process by which CBSDs vacate spectrum in response to the presence of federal incumbents.

### **Discussion**

#### **I. SIA's Objections to the Technical Parameters for CBRS Operation Are Procedurally and Substantively Flawed.**

In its Petition, SIA argues that the Commission should revisit out-of-band emissions (OOBE) and power limits established in the April 2015 *Report and Order* adopting rules for the 3.5 GHz band.<sup>3</sup> SIA also argues that the absence of a limit on antenna heights for Category B CBSDs creates an excessive potential for interference to incumbent FSS operations.<sup>4</sup> Both of these arguments should be rejected.

##### *A. The Commission Established Reasonable OOBE Limits.*

The *Report and Order* establishes reasonable limits on OOBE above 3720 MHz, and the Commission appropriately considered and rejected SIA's arguments for additional protection.

In its discussion of the transition gap above 3700 MHz, the Commission observed specifically that it was establishing a 20 MHz gap, rather than a less stringent 30 MHz gap, because with the bigger gap "there would be a significant impact on the required separation distance between CBSDs operating just below 3700 MHz, and C-Band earth station receivers operating between 3700-3730 MHz."<sup>5</sup> The Commission also specifically

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<sup>3</sup> SIA Petition at 3-7.

<sup>4</sup> *Id.* at 7.

<sup>5</sup> *Report and Order* ¶ 188.

found that a 20 MHz transition gap would “protect[] the operations of earth stations in the C-Band,”<sup>6</sup> rejected arguments to raise OOB limits or make the transition gap wider “at the expense of less spectral efficiency *and increased risk of interference to incumbent systems*,”<sup>7</sup> and acknowledged SIA’s argument that the transition gap should be even smaller or eliminated entirely.<sup>8</sup> The Commission’s lengthy discussion of OOB limits in its *Report and Order* confirms that the arguments of commenting parties were carefully weighed in the course of determining that a 20 MHz gap serves the broader public interest.<sup>9</sup> Furthermore, to the extent that SIA requests special accommodations for frequencies used for telemetry, tracking, and control within the 3700-4200 MHz band,<sup>10</sup> similar arguments have been previously rejected by the Commission, and SIA presents no reason to revisit them.<sup>11</sup>

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<sup>6</sup> *Id.* ¶ 178.

<sup>7</sup> *Id.* ¶ 189 (emphasis added).

<sup>8</sup> *Id.* ¶ 183 (citing Comments of SIA, GN Docket No. 12-354, at 17 (filed July 14, 2014) (arguing that establishing any transition gap “does not make a great deal of sense”) (SIA FNPRM Comments)).

<sup>9</sup> In fact, CTIA has asked the Commission to increase the transition gap to 40 MHz, further confirming the reasonableness of the approach adopted in the rules. See Petition for Reconsideration of CTIA—The Wireless Association at 6, GN Docket No. 12-354 (filed July 23, 2015).

<sup>10</sup> See SIA Petition at 4.

<sup>11</sup> See *In the Matter of Wireless Operations in the 3650-3700 MHz Band, et al.*, Report and Order and Memorandum Opinion and Order, 20 FCC Rcd. 6502, ¶¶ 85-88 (2005) (2005 *Report and Order*) (rejecting arguments that 10 MHz of the 3650-3700 MHz should be allocated exclusively for telemetry, tracking, and control and denying petitions from Lockheed Martin and Echostar arguing that new telemetry, tracking, and control stations in that band should be granted primary status even if other new earth stations were accorded secondary status).

Reconsideration of the reasonable OOB limits is also unwarranted because the Commission's own official records reflect that satellite operations can operate co-channel with commercial wireless providers, rather than merely adjacent to them, with modest separation distances. In 2005, when the Commission adopted rules enabling wireless Internet service providers (WISPs) to offer service using spectrum between 3650 and 3700 MHz, it authorized earth stations seeking to enter the band to operate on a secondary basis.<sup>12</sup> Since then, satellite operators have elected to deploy earth stations in close proximity to WISP operations, even though such satellite operations are not entitled to protection. A Hagerstown, Maryland, earth station (call sign E030101), for example, operates co-channel with nearby WISP deployments, four of which are located within 10 kilometers of this earth station.

The SIA Petition and the Reply Comments of the Joint Content Interests nevertheless argue that separation distances of 10 kilometers or more are needed to protect adjacent channels, as opposed to co-channel, operations.<sup>13</sup> Yet earth stations like the one in Hagerstown were deployed with the knowledge that WISPs could or would be located close by, and satellite operators chose to deploy them anyway, suggesting that earth stations are far more resilient to interference from spectrally proximate systems than the SIA Petition

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<sup>12</sup> *Id.* ¶ 15.

<sup>13</sup> SIA Petition at 9; Reply Comments of the Joint Content Interests at 2, GN Docket No. 12-354 (filed Aug. 14, 2015).

and the Reply Comments of the Joint Content Interests admit.<sup>14</sup> For this reason as well, SIA's challenge to the Commission's reasonable OOB limits should be dismissed.

*B. SIA's New Arguments Regarding Maximum Effective Isotropically Radiated Power (EIRP) Levels and Antenna Heights Are Unsupported and Untimely.*

Although SIA has been an active participant in this docket, it argues for the first time in its Petition that the Commission should have adopted more stringent EIRP restrictions on non-rural Category B CBSDs and maximum antenna height limitations for all Category B CBSDs.<sup>15</sup> New arguments raised on reconsideration generally must offer new facts or rely on events that have taken place since the Commission's final action.<sup>16</sup> Because the SIA

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<sup>14</sup> Earth station deployments in 3650-3700 MHz band also conclusively demonstrate that the 150-kilometer separation distance between grandfathered satellite operations entitled to protection in this band and WISPs, as established in 47 C.F.R. § 90.1331(a), is vastly overprotective. In Hagerstown, for example, there are 9 WISP sites within 50 kilometers of call sign E030101, which was established after December 1, 2000, and therefore operates on a secondary basis. In Sudbury, Connecticut, 21 WISP sites operate within 50 kilometers of a nearby non-grandfathered earth station (call sign KA312). And in Nuevo, California, 5 WISP sites operate within 50 kilometers of a nearby non-grandfathered earth station (call sign E020169). To conduct this analysis, Google collected information regarding active WISP sites from the FCC's universal licensing system (ULS) database. It also compared FSS registrations in the FCC's International Bureau Filing and Reporting System (IBFS) database with the list of grandfathered earth stations available at <http://transition.fcc.gov/ib/sd/3650/> to determine which earth stations are operating on a secondary basis in the 3650-3700 MHz band. Google then compared the locations of secondary, non-grandfathered earth stations with the locations of WISP sites to generate the data set forth above. Earth stations are often clustered together and there are 10 earth stations in the vicinity of Hagerstown, Maryland, 8 earth stations in the vicinity of Sudbury, Connecticut, and 6 earth stations in the vicinity of Nuevo, California. We have listed as exemplars non-grandfathered earth stations for each of these locations. Appropriate protection of grandfathered in-band earth stations is the subject of an ongoing rulemaking by the Commission. *See Report and Order* ¶¶ 436-42.

<sup>15</sup> Petition at 7.

<sup>16</sup> *See* 47 C.F.R. § 1.429(b)(1)-(2).

Petition provides no facts at all to support its arguments and acknowledges that the potential for interference associated with higher antenna heights or higher power levels could be mitigated by the adoption of increased separation distances, consideration of SIA's late-presented arguments does not serve the public interest, and they should be rejected by the Commission.<sup>17</sup>

*C. Even if SIA's Arguments Were Timely, SIA Fails to Recommend a Specific Path Forward.*

SIA's failure to state with particularity how the Commission's rules should be changed provides an additional basis for dismissing these arguments.<sup>18</sup> Rather than arguing for specific revisions to EIRP limits and antenna height parameters, SIA asserts generally that the rules adopted "could increase the potential for interference to incumbent FSS operations."<sup>19</sup> SIA's discussion of antenna height limitations is especially unhelpful: SIA states merely that "the maximum allowed antenna height is an important component of the interference assessment."<sup>20</sup> This wan truism provides no insight into how the Commission's rules should be changed, or why the existing rule fails to strike the right balance. SIA's request to reconsider these aspects of the Commission's rules thus should be dismissed.

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<sup>17</sup> *Id.* § 1.429(c).

<sup>18</sup> *See id.*

<sup>19</sup> SIA Petition at 7.

<sup>20</sup> *Id.*



## **II. The Registration Requirements for Satellite Incumbents Are Reasonable.**

The Commission's framework for the 3.5 GHz band attempts to protect actual users—whether incumbent government radars, satellite earth stations, or Priority Access (PA) deployments—in the times and places that such services are in use, while otherwise permitting commercial wireless uses.<sup>21</sup> The framework establishes reasonable requirements on satellite providers to assist in achieving this objective. Specifically, the requirement to register annually protects earth stations actually in use, and the Commission should confirm that this requirement extends to grandfathered earth stations in the 3650-3700 MHz band.

In requiring earth station operators to register annually, the Commission seeks to collect basic technical information that SIA concedes is necessary to calculate interference protection.<sup>22</sup> All of the information requested is squarely in the possession of earth station licensees. As a result, the licensees are in the best position to provide it to the Commission and, by extension, to SAS providers.<sup>23</sup> SIA concedes that its members must submit many of these parameters when applying for an earth station license, so it is difficult to imagine that the requirement to update such information to ensure appropriate interference protection

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<sup>21</sup> See, e.g., 47 C.F.R. § 96.67 (authorizing the use of an environmental sensing capability to detect and avoid incumbent radars); *Report and Order* ¶¶ 72-74 (authorizing opportunistic use of PA frequencies when not “in use” by a PA licensee).

<sup>22</sup> See, e.g., Reply Comments of SIA at 4, 7, GN Docket No. 12-354 (filed Aug. 14, 2015) (conceding that location, antenna gain, antenna elevation angle, and pointing angles are relevant criteria for interference analysis). Google does not oppose SIA's request to register a range of pointing angles, see SIA Petition at 21, so long as these ranges must be based on actual, rather hypothetical or potential use.

<sup>23</sup> 47 C.F.R. § 96.17(e).

is “unduly burdensome.”<sup>24</sup> SIA effectively admits that annual renewal imposes minimal obligations on satellite providers by noting the basic operational parameters requested by the Commission do not change from year to year.<sup>25</sup> As a result, re-registration simply requires SIA’s members to validate annually that they continue to request interference protection for their earth stations.

Without this information, the Commission would have to make a series of worst-case estimates regarding satellite operations—an approach it rightly rejected in its *Report and Order*.<sup>26</sup> The annual registration requirement also furthers the Commission’s goal of protecting actual use, rather than stale earth station registrations.<sup>27</sup> As explained by the Wireless Internet Service Providers Association (WISPA), dormant earth stations should not foreclose CBSD operation.<sup>28</sup>

Finally, in the context of its ongoing effort to determine appropriate interference protection for earth station operations, the Commission should clarify that the requirement to register annually with the Commission applies to grandfathered earth

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<sup>24</sup> SIA Petition at 17.

<sup>25</sup> *Id.*

<sup>26</sup> *Report and Order* ¶ 288.

<sup>27</sup> *See id.* ¶ 5 (stating that the framework adopted seeks to “optimize[] frequency use to allow maximum capacity and coexistence for both GAA and Priority Access users” while protecting incumbents from harmful interference); *cf. id.* ¶ 73 (noting that in order to discourage spectrum warehousing and incentivize efficient use of the band, PA licensees “should not be permitted to exclude other authorized users unless and until their networks are *in use*”) (emphasis added).

<sup>28</sup> Comments of WISPA at 20, GN Docket No. 12-354 (filed July 14, 2014); *see also Report and Order* ¶ 279 (citing this argument).

station licensees in the 3650-3700 MHz band.<sup>29</sup> Section 96.17(d) establishes that “FSS earth station licensees requesting protection *under this part* [i.e., Part 96] must register with the Commission annually.”<sup>30</sup> By its own terms, this requirement reaches earth stations operating in the 3600-3650 MHz and 3700-4200 MHz bands, which are addressed in section 96.17 of the rules, as well as grandfathered earth stations operating in the 3650-3700 MHz band, which are addressed in section 96.21. Nevertheless, because SIA suggests that the registration requirement does not apply to grandfathered earth stations in the frequencies between 3650 and 3700 MHz,<sup>31</sup> the Commission should state expressly that it does. Of course, other earth stations not protected by the Commission’s *2005 Report and Order* authorizing commercial wireless operations in this 50 MHz of spectrum need not register because they are not entitled to protection from harmful interference.

Taken together, the Commission’s annual registration requirements impose eminently reasonable, minimally burdensome obligations on satellite providers. Without this information, which resides squarely with earth station licensees, SAS providers will not be able to offer appropriately tailored interference protection—needlessly sacrificing spectrum availability and unnecessarily crippling CBSD deployments in this band. For these reasons, SIA’s challenge to the Commission’s registration requirements should be rejected.

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<sup>29</sup> See 47 C.F.R. § 96.17(a)-(b); § 96.21(c).

<sup>30</sup> *Id.* § 96.17(d).

<sup>31</sup> SIA Petition at 18.

**III. The Commission's Approach to Location Accuracy Protects Incumbent Operations While Allowing CBSD Operators Flexibility in Deciding How to Ensure Coexistence with Higher Priority Users.**

Both SIA and NAB challenge the *Report and Order's* geolocation requirements. Each objection lacks merit and should be dismissed. First, discussions of individual records in the television white space (TVWS) databases have little, if any, relevance to this proceeding. Even if the cited records were relevant, they likely represent permissible, good-faith test entries, rather than erroneous or deceptive registrations. Second, the industry is developing a framework for accreditation of professional installers and that process is a timely and appropriate response to requests for additional assurance that geolocation information is registered accurately.<sup>32</sup> Accordingly, as the Commission has already held, professional installation should be permitted for both outdoor and indoor devices.

*A. NAB's Arguments Regarding Individual White Space Device Records Do Not Warrant Reconsideration of the Report and Order.*

NAB rehashes the same arguments on which it relied when seeking an "Emergency Motion for Suspension of Operations" of TVWS databases and devices.<sup>33</sup> NAB's ongoing resistance to the Commission's TVWS rules has no place here, and its arguments are even less persuasive in this proceeding than they were when made in the TVWS context.

In the TVWS proceeding, which addresses a different spectrum band and a different set of rules, NAB highlighted the existence of entries in TVWS databases with generic e-

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<sup>32</sup> *Report and Order* ¶ 222.

<sup>33</sup> NAB Petition at 4-5; *see also* NAB Emergency Motion for Suspension of Operations and Petition for Rulemaking, RM-11745 (filed Mar. 19, 2015) (NAB TVWS Petition).

mails, phone numbers, or other contact information.<sup>34</sup> But the existence of these entries does not show that “humans [made] mistakes” or that contact information was “falsified.”<sup>35</sup> Instead, the contact names and addresses cited by NAB likely represent innocent test entries. For example, as explained by Google in response to the NAB TVWS Petition, contact names such as “first\_last” or “Meld\_test” are almost certainly professional tests.<sup>36</sup> (Meld Technology is a company in Sunnyvale, California, that makes white space devices.<sup>37</sup>) While it may not have been a best practice to accompany test entries with generic address information, there is no reason to suspect that these entries represent actual devices in the field that could interfere with reception of television broadcasts. Manufacturers and database administrators create test entries for a variety of legitimate reasons, such as ensuring that databases are exchanging information in compliance with the FCC’s rules, ensuring that devices can communicate their location to databases, and verifying that updated devices continue to communicate securely.

Despite filing an “emergency” motion more than six months ago, NAB has yet to point to *a single case* of harmful interference to the operations of its members. The fact that no broadcaster has ever asserted a claim of interference demonstrates that NAB’s

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<sup>34</sup> NAB Petition at 4-5.

<sup>35</sup> *Id.* at 4-5.

<sup>36</sup> NAB TVWS Petition at 10 (alleging that “at one point, more than 80 devices listed ‘Meld test’ as the contact name”).

<sup>37</sup> Meld Technology, <http://www.meldtech.com/staging2/> (last visited Oct. 19, 2015).

fearmongering does not support revisiting the Commission's geolocation accuracy requirements either in this proceeding or in the context of TVWS operations.

*B. The Record Demonstrates That Professional Installation Can Protect Incumbents.*

NAB also asserts that allowing professional installation is "fatally flawed and cannot be corrected."<sup>38</sup> The statement is baseless hyperbole. Indeed, for industry stakeholders are even now developing an accreditation program for professional CBSD installers.<sup>39</sup>

Without any support or explanation, NAB asserts that an installer authorized by the device manufacturer is likely to be more reliable than one vetted in accordance with a multi-stakeholder, collaborative, industry-led process.<sup>40</sup> Logic suggests exactly the opposite: certification through an established industry-wide process will require all professional installers to adhere to a set of jointly developed standards, rather than depending on each manufacturer to determine whether an individual or entity is qualified to install devices. Moreover, establishing a class of certified professional installers will make it easier to enforce the Commission's rules. If the Commission discovers non-compliant devices, there will be a repository of contact information for the professional

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<sup>38</sup> NAB Petition at 5; *see also* SIA Petition at 14-15.

<sup>39</sup> *Report and Order* ¶ 222; *see also* Letter from Alex Phillips, Vice President and FCC Committee Chair, WISPA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 (filed July 9, 2015) (stating that WISPA is developing a certification program for professional installers and inviting stakeholders to work with WISPA to help develop an effective program).

<sup>40</sup> NAB Petition at 6.

installers who set them up.<sup>41</sup> Overall, the record reflects that professional installation can and will be improved for CBSDs, ensuring that professionally installed devices do not cause harmful interference to incumbent licensees.

*C. The Commission Should Continue to Permit Professional Installers to Report CBSD Positioning and Also Allow Devices to Provide Geolocation Accuracy Information to SAS Providers.*

In its Petition, NAB recognizes that indoor devices relying on automated geolocation techniques may face challenges in meeting the Commission's geolocation accuracy requirements.<sup>42</sup> For the reasons stated above, relying on professional installation rather than automated geolocation is one appropriate approach to ensure that indoor devices accurately report their location. Indeed, the arguments for allowing professional installation apply with even greater force to indoor devices: Not only are indoor devices harder to geolocate, they also pose a comparatively lower risk of interference to protected operations because they are likely to be shielded from incumbent operations by interior and exterior walls.

The Commission should authorize another approach in addition to, but not in lieu of, professional installation. As requested by NAB itself, the FCC should permit SAS providers to calculate spectrum availability based on geolocation capabilities and

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<sup>41</sup> Nor does the existence of mass-market consumer equipment, such as "in-home wireless speakers to an in-home network to send pictures and video from a camera to multiples TV in the home" dictate an automated geolocation requirement for CBSDs. NAB Petition at 6. These sorts of in-home devices are highly unlikely to cause interference because they will be separated from satellite earth station operations by many meters, if not many kilometers, and multiple building walls.

<sup>42</sup> NAB Petition at 7; *Report and Order* ¶ 220.

information reported by devices, even if those devices cannot meet the requirement to determine horizontal position within 50 meters and vertical position within 3 meters.<sup>43</sup>

Where a device's location uncertainty exceeds 50 meters, the spectrum available to it should be calculated based on the possibility that the device could be anywhere in the radius of uncertainty.<sup>44</sup> Conversely, where a device can pinpoint its accuracy more precisely, it should be entitled to operate closer to protected operations than a device with poorer geolocation capabilities. This approach provides an incentive for device manufacturers to improve location accuracy, enables additional indoor operations, and offers service providers flexibility in the technologies they choose to protect incumbent operations.

In sum, to promote a diversity of devices and uses in the band, the Commission should continue to permit professional installers to report CBSD positioning *and* modify its rules to allow devices to provide geolocation accuracy information to a SAS.

*D. SAS Providers Should Not Be Required to Perform Additional, Detailed Validation of Location Data.*

While arguing for reconsideration of the professional installer rules, SIA urges in passing that the Commission should ensure SAS providers have "incorporated verification

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<sup>43</sup> Compare 47 C.F.R. § 96.39 (establishing these requirements) with NAB Petition at 7-8 (recommending a flexible approach).

<sup>44</sup> Cf. *In the Matter of Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, et al.*, Report and Order, 2015 FCC LEXIS 2036, Appendix A (Final Rules) (2015) (revising 47 C.F.R. § 15.711(b)(1) and 47 C.F.R. § 15.712 to adopt this flexible approach for TVWS devices).



procedures to check the validity of location data.”<sup>45</sup> This argument appears to address *implementation* of the Part 96 framework for certifying SAS providers, not the revision of Part 96 rules themselves. Section 96.61 establishes reasonable security and verification procedures, and the Commission will evaluate SAS performance during the certification process. Because SIA will have an opportunity to raise relevant issues during that process, the Commission should not modify its rules regarding the verification requirements applicable to SAS providers.

#### **IV. Modest Technical Amendments to the Rules Will Maximize Spectrum Availability While Protecting Incumbent Users.**

As set forth above, the Commission’s Part 96 rules generally strike the right balance in according incumbent users protection from harmful interference while establishing a framework for widespread use of the 3.5 GHz band. But the Commission should consider two specific adjustments: First, it should grant the request of the Wireless Innovation Forum (WinnForum) to clarify the rule limiting CBSD transmissions to a received signal strength of -80 dBm at the boundary of a service area.<sup>46</sup> The rule, as adopted, needlessly limits spectrum availability in many cases, and may inadequately protect PA license (PAL) users in others. Second, and as also urged by the WinnForum, the Commission should

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<sup>45</sup> SIA Petition at 15.

<sup>46</sup> WinnForum, Petition for Reconsideration at 11-20 (filed July 22, 2015) (WinnForum Petition); *see also* Petition for Reconsideration of Motorola Solutions Inc. at 1 (filed July 23, 2015) (Motorola Solutions Petition).

clarify or correct its rules regarding the process by which CBSDs vacate spectrum in response to information about the presence of incumbents.<sup>47</sup>

A. *To Protect PAL Operations Without Limiting CBSD Deployment, the Commission Should Modify its Rule Limiting Transmit Power at the Edge of a Census Tract.*

The Commission should grant the WinnForum's request to modify PAL protection criteria at the boundary of each census tract. In its *Report and Order*, the Commission adopted a rule requiring CBSD transmissions to be managed such that the aggregate received signal strength, measured at any location on the service area boundary of a co-channel priority access licensee, does not exceed an average (rms) power level of -80 dBm in any direction when integrated over a 10 MHz reference bandwidth, with the measurement antenna placed at a height of 1.5 meters above ground level, unless the affected licensees agree to an alternative limit and communicate that to a SAS.<sup>48</sup> But as described in the WinnForum's Petition and Google's Response to the Commission's *Second Further Notice of Proposed Rulemaking (Second FNPRM)*, this approach will often lead to underutilization of spectrum.<sup>49</sup>

The problem is especially acute in geographically large or irregularly shaped census tracts and in census tracts where the boundary edge is at a different elevation than the rest of the tract.<sup>50</sup> In the former case, limited deployment in one part of the tract may foreclose

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<sup>47</sup> WinnForum Petition at 3-5.

<sup>48</sup> *Report and Order* ¶ 195.

<sup>49</sup> WinnForum Petition at 11-20; see also Comments of Google Inc., GN Docket No. 12-354, at 13-17 (filed July 15, 2015) (Google Comments on Second FNPRM).

<sup>50</sup> WinnForum Petition at 14-17; see also Google Comments on Second FNPRM at 15-17.

deployments that are sited in an adjacent tract but are nowhere near the operations the rule seeks to protect.<sup>51</sup> In the latter, protecting a boundary edge sited at a relatively high elevation may be wholly unnecessary because lower-elevation locations within the tract may receive less energy even if they are closer to the transmitter.<sup>52</sup> And where the census tract boundary is at a particularly low elevation, the rule may provide insufficient protection: Because CBSDs sited at the higher elevations in the interior of a census tract may not be shielded by terrain, they could experience higher interference levels than CBSDs at the census tract boundary, where the -80 dBm limitation is defined.<sup>53</sup>

For these reasons, the Commission should protect at the -80 dBm/10 MHz level those areas where CBSDs actually are deployed—rather than census tract boundaries that may or may not be proximate to real-world operations and may have very different topography than the areas where deployments are sited. The Commission should adopt these modifications when it clarifies how it will determine whether channels are “in use” by priority access licensees.<sup>54</sup>

*B. The Commission Should Reconsider and Clarify its Rules Regarding the Process by Which CBSDs Vacate Spectrum in Response to Federal Systems.*

The Commission should also grant the WinnForum’s request to reconsider the rule requiring SAS providers to “confirm suspension of [a] CBSD’s operation or its relocation to

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<sup>51</sup> WinnForum Petition at 16-17.

<sup>52</sup> *Id.* at 14-15; Google Comments on Second FNPRM at 15-17.

<sup>53</sup> WinnForum Petition at 13-14; Google Comments on Second FNPRM at 13-14.

<sup>54</sup> Both Google and the WinnForum submitted detailed proposals for defining when spectrum is “in use” such that an area is entitled to protection. See Google Comments on Second FNPRM at 2-12; WinnForum Petition at 17-21.

another unoccupied frequency, if available” within 60 seconds of receiving an environmental sensing capability’s (ESC) communication “that it has detected a signal from a federal system in a given area.”<sup>55</sup> This rule, section 96.15, imposes requirements on SAS providers and devices that may be difficult to meet in practice. In order to fully vacate a band in response to an ESC signal, multiple SAS providers will need to execute and confirm instructions to CBSDs, and each must then exchange information with all other SAS providers. This distributed architecture will involve “complex non-linear transmission, queuing, and processing delays that will require ongoing design, tuning, and optimization.”<sup>56</sup> A reasonable rule would allow 600 seconds for relocation of CBSDs in response to an ESC command, rather than 60 seconds.<sup>57</sup>

In addition, reading section 96.15 in conjunction with section 96.39 creates an unworkable and confusing set of timelines that the Commission must clarify.<sup>58</sup> In section 96.39, the Commission requires a CBSD to “cease transmission, move to another frequency range, or change its power level within 60 seconds as instructed by an SAS.”<sup>59</sup> But, as noted, section 96.15 requires a SAS to “confirm suspension of the CBSD’s operation or its relocation to another unoccupied frequency, if available” within 60 seconds of receiving an

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<sup>55</sup> WinnForum Petition at 3-5; 47 C.F.R. § 96.15(a)(4); § 96.15(b)(4); *see also* Motorola Solutions Petition at 1.

<sup>56</sup> WinnForum Petition at 4.

<sup>57</sup> *Id.*

<sup>58</sup> *See* Letter from Aparna Sridhar, Counsel, Google Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 (filed Sept. 9, 2015) at 3.

<sup>59</sup> 47 C.F.R. § 96.39(c)(2).

ESC's communication "that it has detected a signal from a federal system in a given area."<sup>60</sup>

Thus, while section 96.39 contemplates that up to one minute may elapse between a SAS command to vacate spectrum and a CBSD ceasing transmission, section 96.15 could be read to imply that the communication must take place in less than one minute because it allots only one minute for communications to pass from an ESC to all SAS providers and then on to CBSDs affiliated with each SAS. At a minimum, the Commission should clarify these timelines to provide meaningful guidance to incumbent users, SAS providers, and CBSD manufacturers alike.

In revisiting this rule, the Commission should reject SIA's proposal to shorten either the 60-second interval permitted for a CBSD to limit potentially interfering activity after receiving a SAS command to cease transmission, move to another frequency range, or reduce power,<sup>61</sup> or the 60-second interval permitted for CBSDs to update their location information after they have moved.<sup>62</sup> The Commission has already considered and rejected SIA's arguments on this point. In response to the Commission's 2014 *Further Notice of Proposed Rulemaking* in this proceeding, which proposed rules functionally identical to those adopted by the Commission earlier this year,<sup>63</sup> SIA argued that "60 seconds is too long an interval for CBSD location reporting and especially for responding to

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<sup>60</sup> *Id.* §§ 96.15(a)(4) & (b)(4).

<sup>61</sup> SIA Petition at 13.

<sup>62</sup> *Id.* at 16.

<sup>63</sup> *In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking, 29 FCC Rcd. 4273 ¶ 63 (2014), Appendix A (Proposed Rules), §§ 96.39(a)(3); 96.39(c)(1).

a frequency change or shut-off command from the SAS.”<sup>64</sup> The Commission recognized these arguments, but adopted “the location accuracy requirements set forth in the [*Further Notice of Proposed Rulemaking (FNPRM)*]” after a “thorough review of the record.”<sup>65</sup> SIA provides no new evidence or information justifying reconsideration beyond generally asserting that interruption of satellite telemetry could be problematic.

Moreover, the rule change that the SIA Petition seeks—requiring CBSDs to cease transmission “immediately” following a command from a SAS—cannot be achieved in the real world.<sup>66</sup> There will always be *some* latency between a SAS’s instruction and a CBSD’s execution of that instruction. The Commission’s 60-second requirement establishes a reasonable interval for executing shut-off commands; the record is complete on this issue; and there is no reason to revisit it.

Even if SIA’s claims did have merit, and satellite operators did require additional protection during limited-duration events such as launch and early orbit phase (LEOP) or drift operations, those requests would best be handled by a SAS on a limited-time basis. The Commission should not let the worst-case scenario drive a general rule to be applied in all cases. Indeed, the proposed architecture for SAS operations, as adopted by the WinnForum, includes an “informing incumbents” functionality, which allows incumbents to communicate times and places of special operations that may not otherwise be protected by the SAS as part of its routine functions. While this functionality was developed to allow

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<sup>64</sup> SIA FNPRM Comments at 8; *see also id.* at 12-13.

<sup>65</sup> *Report and Order* ¶ 219.

<sup>66</sup> SIA Petition at 10, 12.

the federal government to declare emergency operations outside of ESC-derived detections, it could also be used by the satellite industry to alert a SAS of a request for additional protection during limited-duration LEOP and drift operations.<sup>67</sup> Thus, under no circumstances would SIA's arguments justify imposing more burdensome requirements on CBRS systems at all times and places.

### **Conclusion**

The Commission's *Report and Order* embodies a careful balance that will enable intensive use of the 3.5 GHz band while appropriately protecting higher-priority users. SIA's and NAB's invitations to reconsider major aspects of that framework should be rejected, and their petitions should be dismissed.

Respectfully submitted,



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<sup>67</sup> See SAS Functional Architecture, WinnForum Document WINNF-15-P-0047-V1 0 0, at 5, available at <http://groups.winnforum.org/Reports>.

### **Certificate of Service**

I, Sybil Anne Strimbu, state that copies of the foregoing Response of Google Inc. to Petitions for Reconsideration were sent via first-class mail to the following:

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